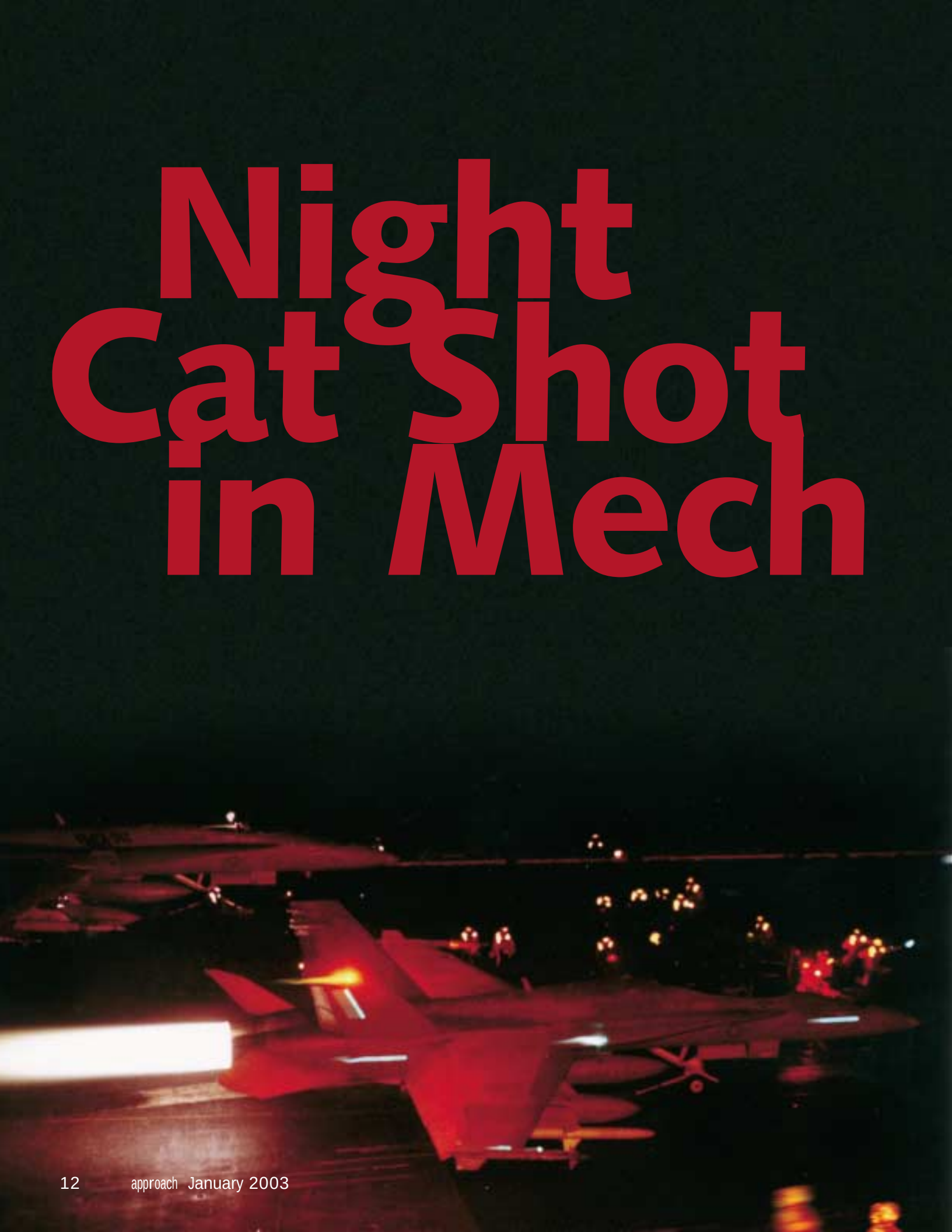
Night Cat Shot in Mech



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By Lt. Christopher M. Schmidt

It was a particularly dark, moonless night in March, when I explored the mechanical capabilities of the FA-18C. We had been operating in the 5th Fleet AOR for two weeks, and it was my second OEF airborne-spare mission since arriving.

Because we were the new CV on the block, we operated on the night page and conducted vampire ops. I hoped somebody would get cancelled, so I would get the 5+00 day trap, vice the 1+30 airborne re-spot and good-deal night trap. Everyone checked in good on deck, so the odds of getting the night trap looked inevitable. The yellowshirts gave the standard night-taxi fam from the four row to cat 3, with a delay under the bright sodium lights, which destroy night vision.

While crossing the JBD and mentally reviewing the settle-off-the-cat boldface, I verified the takeoff checks were complete. The motivated weight-board petty officer frantically jumped around to verify the proper weight-board setting of a 44,000-pound shot, and I said, “Give me a break already; I’m doing this alone in here.”

I set 75 percent and took the remaining tension out of the buffer hook and holdback assembly. A motivated ordnanceman armed the ’Winder. So far, so good. The yellowshirt gave the take-tension signal, and I ran up the F404-GE-400s. With indications normal after the wipe out, no spurious BLINS, and the hyds stable, I flicked the pinky switch. My externals lit up, and the deck-edge petty officer did his thing. I selected full afterburner upon holdback release.

Everything was routine until halfway through the stroke—the unsettling deedle-deedle.

At the end of the stroke, all the displays flickered off and then on again. Now what? With weight-off-wheels, I noticed the aircraft did not rotate and capture on-speed AOA. I immediately started the boldface items mentioned earlier, and I went to 10-degrees-pitch attitude with the waterline symbol. Somewhere in all this, I raised the landing gear.

Full afterburner already was selected at the hold-back release. However, the velocity vector still did not rise above the horizon, so I went to 15 degrees and got a positive VSI. Because I couldn't recall the RadAlt going off, I didn't emergency jettison my stores. Fearful it was my mistake for grabbing the stick too soon—the Hornet flight-control computers (FCC) use AOA to program the stabilator position to capture a predetermined attitude—I eased the back-stick pressure. The nose rapidly dropped, and I saw my altitude and airspeed boxes fall below the horizon. This action, in conjunction with a night cat shot, contributed to a full-blown case of pilot-induced oscillations (PIOs).

With the stick full aft, the PIOs dampened but left a limited range of motion. I inputed nose-up trim for what I thought would provide more aft-stick authority–the first clue that this might be a MECH ON condition. At this point, the rubber-coated, ejection-seat handle was pressed against the backside of my wrist, and that was comforting to know.

I scanned more displays, and I saw the flight-control system (FCS) and MECH ON cautions at the bottom of the left DDI, reaffirming my initial assessment. I called for a representative on departure freq.

MECH ON is caused sometimes by a mismatch between what the FCCs are calculating and what the mechanical linkage indicates for the stabilators. The Hornet was designed with this backup system for FCC failures.

The response from CATCC was not reassuring, so I called my wingman on aux and asked for his assistance. After more oscillations by the jet and a case of vertigo for me, I finally maintained a positive rate of climb. I started to feel in control of the aircraft, and I developed a feel for the new flight-control regime. However, it was a false sense of security. I saw the flap light transition from green to amber as the airspeed fell from my scan with afterburners fully staged. Oops, flap blowback, and another set of PIOs. A NATOPS caution refers to selecting the flap switch to auto before 250 knots, while in MECH, or standby for magnified PIOs. I deselected afterburner and re-evaluated.

Departure told me the aircraft rep was available on button 19. As I switched, my scan broke down again. While holding the same attitude as I had with full afterburner selected, the nose started to fall, as did airspeed. I again found myself in the flap-transition phase of flight. I reselected afterburner, eased the nose for airspeed, and placed the flap switch in the proper position: auto. Not comfortable with what my inner ear told me, I fought the urge to pull up. This was the first time altitude had entered my scan.

I recalled, from seconds earlier, the altitude rising from the hundreds of feet to thousands of feet, and now it finally read 2,500 feet. After a brief conversation with my rep, CAG's calming voice broke the radio waves. We evaluated the FCS page and saw all four channels of both servos on the right and left horizontal stabilators had X'd out. Now, leveling off at 10,000 feet and 275 knots, I recalled the MECH-stick-recentering function of the takeoff-trim button. When you are in MECH, the stick physically moves with the trim inputs. Pressing this button recenters the stick but holds the same trim inputs. After holding back the stick only inches from my lap, for straight and level flight, recentering the stick was quite a relief.

I tried the first FCS reset, and the nose abruptly pitched down. The velocity vector appeared steady on the horizon, but the airspeed and altitude boxes quickly framed 20 degrees nose low. After we regained control and composure, we decided to jettison the 2,000-pound

JDAM on my left wing. We visually cleared the area with our NVGs and by coordinating with strike. At 15,000 feet, heading toward the divert over 300 miles away, the JDAM came off without incident. Another try to reset the FCS resulted in another abrupt nose down and negative results. We made the decision to divert with wingman in tow.

The nose was very sensitive to pitch movements and airspeed changes. It reminded me of flying the T-34 or any other aircraft that isn't computer stabilized. My wingman assisted with radio coordination and divert-airfield descriptions.

My only priority was to fly the aircraft. The transit was uneventful. We went over our landing-ashore procedures, selected the correct switch positions, and reviewed the emergency again. We referred to the PCL about landing configurations and for a controllability check. Twenty-five minutes later, I had three green and an on-speed check that matched my wingman.

Nose pitch still was sensitive to stick movement but slow to affect the flight path. The PAPI lights and velocity vector provided a reference for the recommended, minimum-rate-of-descent landing. On touchdown, the jet wanted to fly again, so I pushed the stick full forward, and the jet got loose (look out Jeff Gordon). Use of the rudders and NWS helped the condition.

I applied the brakes at 100 knots and didn't use aero-braking. A buildup of catapult grease affected the brake response, but braking action finally felt normal as the long-field gear approached. The divert did not have runway-remaining boards, and the arresting gear was not bi-directional, as with the long field gear. My wingman reassured me that I had plenty of runway remaining. The jet stopped 100 feet short of the threshold on the 10,000-foot runway.

After sunrise, we did a quick turn for the maintainers, and big surprise, we couldn't find anything wrong. Ultimately, maintenance decided to change out the stab servos, based on the aircraft's codes from the previous night. Another quick turn, and it was 4.0, but, during the FCF takeoff roll, the jet once again reverted to MECH, passing 70 knots. After a quick swap of the computers, the jet was good to go.

The ship's AIMD inspected the FCCs and servos but returned them A799: nothing wrong. How confident would you be in that assessment? We have yet to receive the engineering investigation to support this finding.

If not for the simulators and various emergency-procedure and NATOPS checks, I probably wouldn't have recognized the MECH condition and ejected. After all, nine out of 10 pilots eject in the sim with this scenario.

It reminded me of flying the T-34 or any other aircraft that isn't computer stabilized.

Had it been daylight, or with some type of horizon, the face full of water may have motivated me to give the airplane back to the taxpayers. What you don't see can't hurt you.

As the flight deck went by in my peripheral vision, I had the initial cue that something was wrong. Scan everything.

Aircrew coordination is paramount. Hearing an experienced and familiar voice in a difficult situation helps bring order to the chaos. My wingman, being in position at all times, helped prevent incidents en route and when the jet was on deck.

Lt. Schmidt flies with VFA-136.